# Approaches for Developing Measures of Exposure to Contaminants in Drinking Water

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Tracks 2006: Implementing the Tracking Network
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# Why are we here?

- Think about and discuss ideas about drinking water measures
  - Presentations of past work
  - Discussion of developing drinking water measures for Tracking

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# Where have we been?

- CSTE Environmental Public Health Indicators:
  - CDC-CSTE joint project
  - Indicators in many areas
  - Technical information on data sources
- EPHT Indicator Activity
  - Evaluation of feasibility of indicators
  - State developed indicators

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# Where have we been?

- SEHIC
  - State-based
  - Feasible indicators
  - Relative consistency between states
  - Drinking water
    - Percent of population on public water supplies / private sources
    - Distribution of population delivered water at different concentrations of arsenic / THMs
- Drinking Water Exposure Methods Group

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# EPHT: Where are we going?

- Assessment of drinking water data sources
- Development of drinking water measures
  - Content Workgroup Team
  - Review/consensus
  - Finalize
  - Continued development
- Implementation by July 07: Track these measures

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# Drinking Water Exposure Group

- Purpose:
  - Development of methods for estimating population exposures to drinking water contaminants
  - Joint effort by WI, WA, NM, NJ, CA
- Supplemental grant from CDC

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# Drinking Water Exposure Group

- Work
  - Developed framework for identifying and assessing methods
  - Assess current data availability and implications for estimating population exposures
  - Develop recommendations for 'next steps'
    - New data sources
    - New data collection
    - New methods development
- Products
  - White paper
  - Tool for assessing data availability from water purveyors

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# Exposure to contaminants in drinking water

- Consumption
  - Behaviors
  - Quality

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# Exposure to contaminants in drinking water

- Consumption
  - Behaviors
    - Type of water: tap, bottled, work/school
    - Amount consumed
    - Cooking
  - Quality of water used
    - Bottled/vended water
    - Tap
      - Home treatment

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# Exposure to Contaminants in Drinking Water

- Inhalation
  - Behavior
    - Showering, bathing
    - Water using appliances
  - Quality used – quality at tap

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# Types of water supplies

- Community water supplies
  - Subject to SDWA
  - Community: not TNC or NTNC
- Private water supplies
  - Not subject to SDWA
- Small water supplies
  - Serving between 2 or 4 to 14 connections

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# Exposure to Contaminants in Drinking Water

- Quality at tap
  - Quality in distribution system at service line
  - Changes in quality during distribution
  - Quality of each input / Point of Entry (POE)
  - Mixing/hydraulics: pressure/quality zones

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# Exposure to Contaminants in Drinking Water

- Quality at POE
  - Direct measurements at POE (or close)
  - Estimates of quality
    - Source quality
    - Source contribution
    - Treatment train (removal efficiency)
  - Variability in quality/ temporal aggregation

That's all we need……

for a single household

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# Exposure to Contaminants in Drinking Water

- Who is on what system?
  - Community water systems
    - Location of households
    - Spatial extent of distribution system
    - Spatial extent of pressure/quality zones
  - Private water systems
    - Location of well/household(s)
    - Regional groundwater quality

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# Four questions

- What is the quality going into the distribution system?
- What is the quality within each part of the distribution system?
- Who is served by each part of the distribution system?
- What household factors and behaviors affect exposure?

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# Community Water Supplies: The Simple Case

- Quality measurements at POE
- Little variability or well-characterized
- Simple distribution system, no variability across distribution system
  - One POE or distinctly separate zones
  - Conservative constituent
- Knowledge of extent (municipal boundary)
- Estimates of type of water/amount consumed

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# Private supplies: The Simple Case

- Quality measurements exist
- Measurement ‘representative’ – QC
- Location known

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# (simple) Data assessment

- For each type of data (data element):
  - Who has it?
  - Would they give it to us?
  - What format?
  - Data quality issues.
- Hierarchy of usefulness

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# Types of data: Community Water Supplies

- # connections/ pop served
- Contaminant levels: Monitoring data for regulated contaminants.
  - date, LOD, actual values reported?,
  - frequency of sampling, location (POE/source)
  - non-regulated parameters?
  - variability of water quality
- Spatial extent of distribution system
- # of POE to distribution system
- Source information:
  - number of sources
  - types (well, surface, infiltration gallery, interties)
  - source locations
- Treatment plant: #, treatment train
- Source contribution
  - temporal patterns in source contribution
  - allocation limits
- Variation in quality in dist. sys.
  - pressure zones
  - travel/residence time in different pressure zones
- Locations/existence of private sources
- Billing/service location addresses (purveyors)

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# Types of data: private water supplies

- Location (lat/long, street address)
- Well (source) monitoring data
  - which parameters,
  - date, LOD?, actual values reported?
  - frequency of sampling
  - reason for sampling
- Groundwater monitoring data
- Well characteristics:
  - age
  - status (abandoned?)
  - casing type, depth, screening depth
- Uses (potable, irrigation)

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# Results of data assessment from five states

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# Results of data assessment from five states

- Commonalities
  - Availability and data elements of regulatory water quality data
  - Availability of source data
  - No data on source contribution
  - Unclear if hydraulic/travel time data available
  - Unclear if address data available

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# Results of data assessment from five states

- Differences
  - Distribution of populations served by different types of water supplies
  - Information on treatment trains
  - Availability of private well water quality / location information
  - Availability of data on small water systems
  - Availability of info on spatial extent of distribution systems

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# What do purveyors have? (and what would they give us?)

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